

KF-510 Series Turbine Flow transducer

user's manual



NINGBO KIO FLOW INSTRUMENTS CO.,LTD

ISO9001-2000

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1. Digital paddlewheel meters

KF510 series is as a speed flow metering,used to measure the full closure of pipeline and continuous flow of volume liquid.it is good for low viscosity liquids that can with high accuracy of instant and totalizer flow.

Features:

High accuracy digital paddlewheel technology

Rate and total flow display

Easy to operations and read,eight large digital LCD display

Install quickly on existing pipe

No pressure drop

Corrosion resistant PVDF sensor

Minimal maintenance required

Long-life lithium battery

Stopped-flow instructions

Diversification installation

Totalizer :can be reset and the
permanent preservation

User set security password

Paddlewheel flow sensor

Item	paddlewheel flow sensor
Velocity range	0.3~6m/s
Diameter	DN10-DN50 (with PVDF triplet) DN65-500(insert type)
Wetted material	Sensor:PVDF Impeller:PVDF Shaft lever:ceramics
Seal ring	Viton,EPDM
Working temperature	PVDF: -20~ +140°C
Working pressure	1.0MPa , 0.8MPa

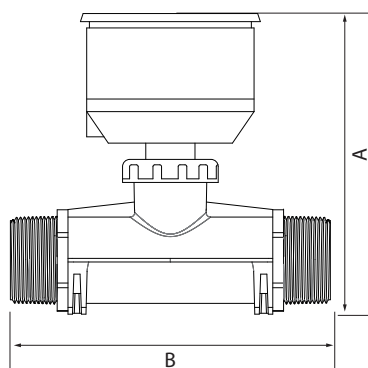
Technical parameter

Item	Flow Convertor
Model	KF510
Full scale accuracy	±1%, ±1.5%
Repeatability	±0.5%
Temperature	-20~ +65°C
External dimension	100x100mm
Installation method	Panel mount、compact type(DN10~DN50)
Power supply	DC24V, battery power supply, AC220V
Output signal	4~20mA, Passive pulse
Communication	RS485
Alarm	Upper limit,lower limit,totalizer
Protection class	IP65
Consumption	2W

2. Range

Technical parameter

DN(mm)	Range (m³/h)	Male	Press (MPa)	temp. (°C)	A mm	B mm
10	0.1~1.8	G3/8"	1.0	≤80°C	152	121
15	0.2~4	G1/2"			152	130
20	0.3~6	G3/4"			158	142
25	0.5~12	G1"	0.8		158	141
40	1.5~24	G1½"			168	175
50	2~40	G2"			184	175



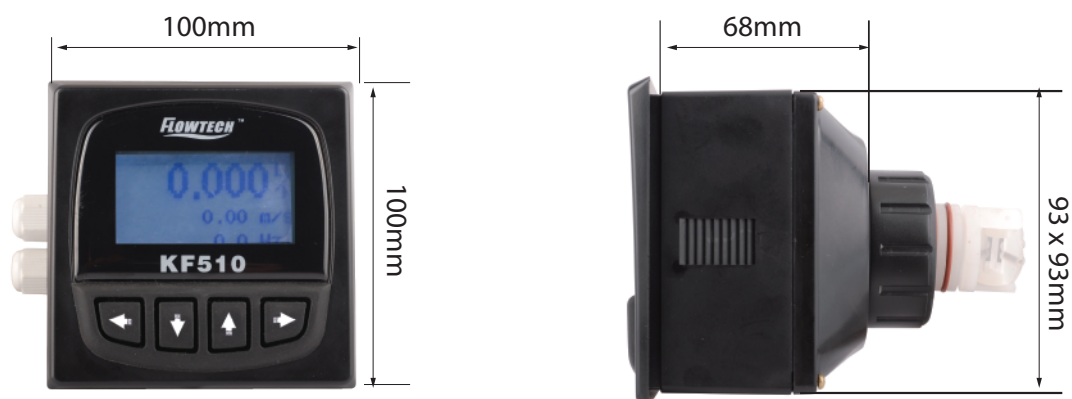
Insert type technical parameter

DN(mm)	Range (m³/h)	Press (MPa)	temp. (°C)
50	3~30	0.8	≤80°C
65	5~50		
80	8~80		
100	10~100		
125	15~150		
150	35~350		
200	50~500		
250	80~800		
300	100~1000		

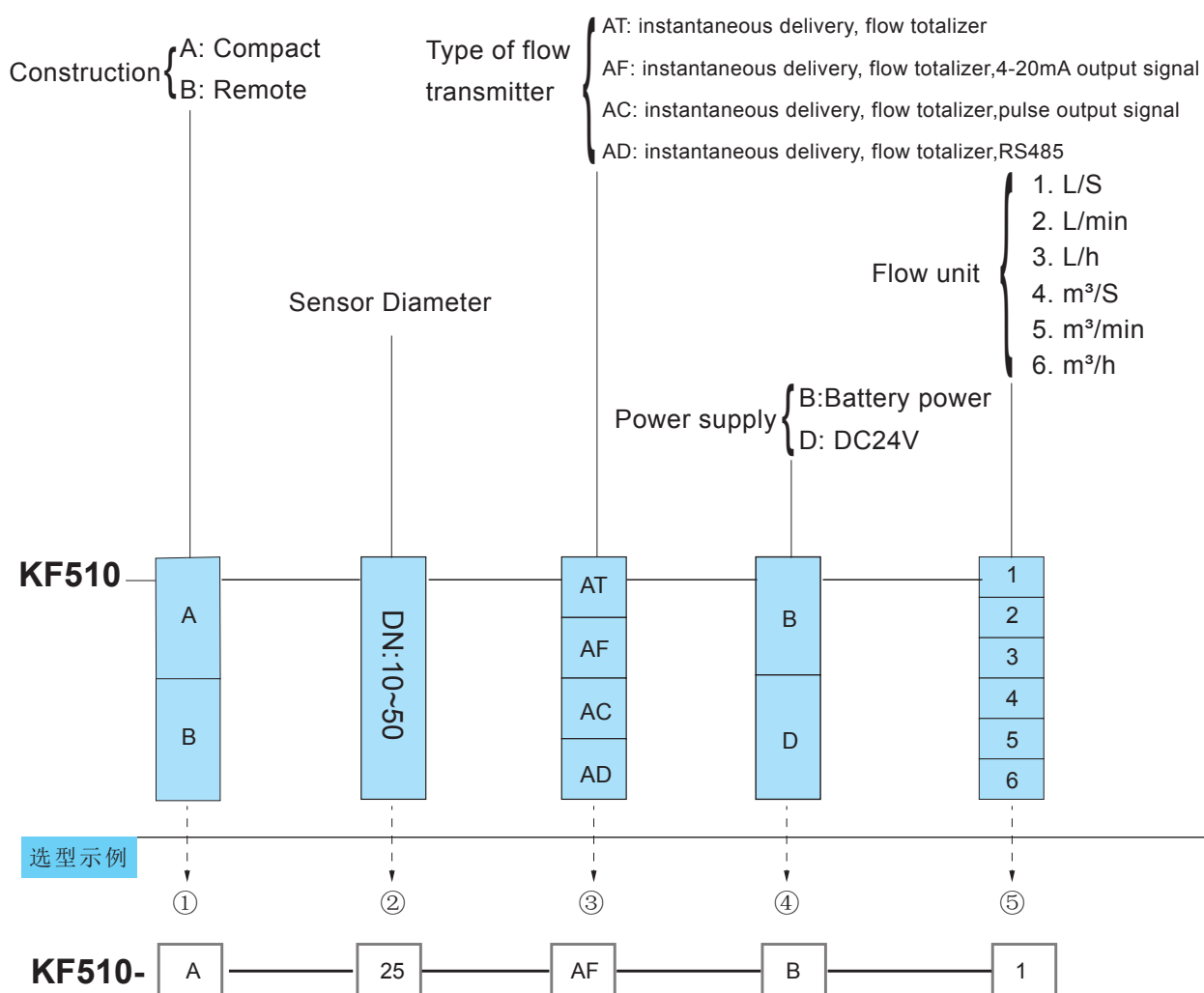
Application

- Water treatment systems
- Process treatment/ distribution
- Irrigation system
- Filtration system
- Swimming pool and hot spring
- Groundwater packing
- Counter-infiltration
- Process flow monitor
- Ultra-pure water delivery
- Desalination and recycle
- Process cooling water

3. External dimension



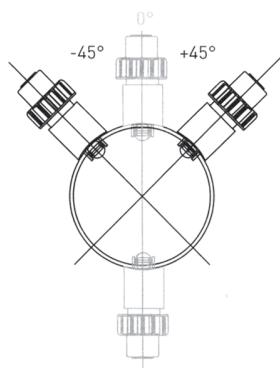
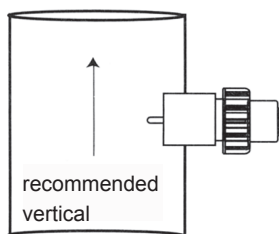
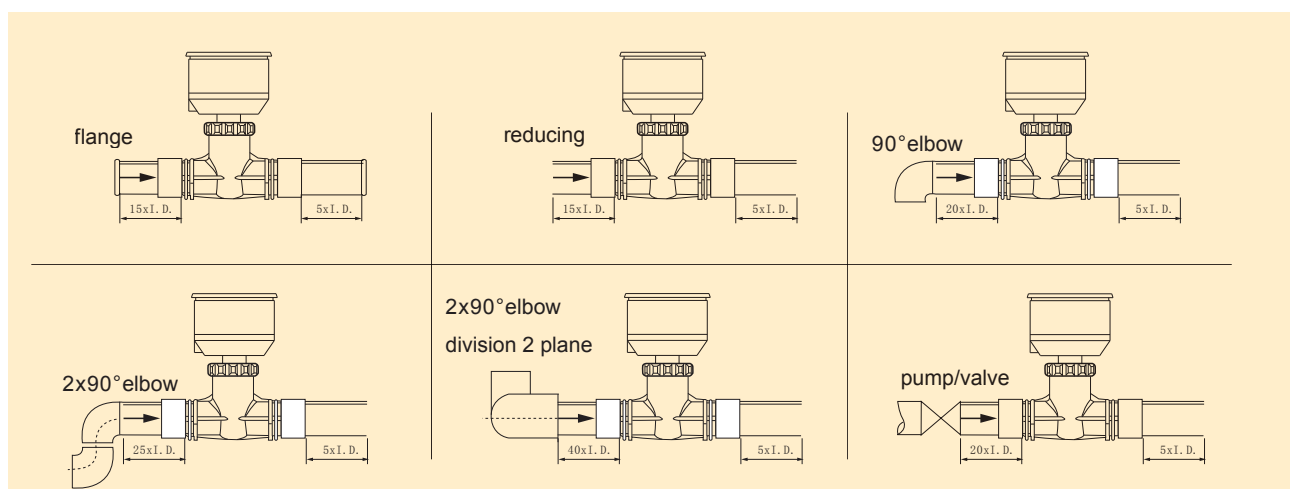
4. KF510 lectotype



5. installation requirements

Minimum straight pipe length requirements

The digital paddlewheel meters' accuracy is affected by disturbances such as pumps, elbows, tees, valves, etc. in the flow stream, install the meter in a straight run of pipe as far as possible from any disturbances. the distance required for accuracy will depend on the type of

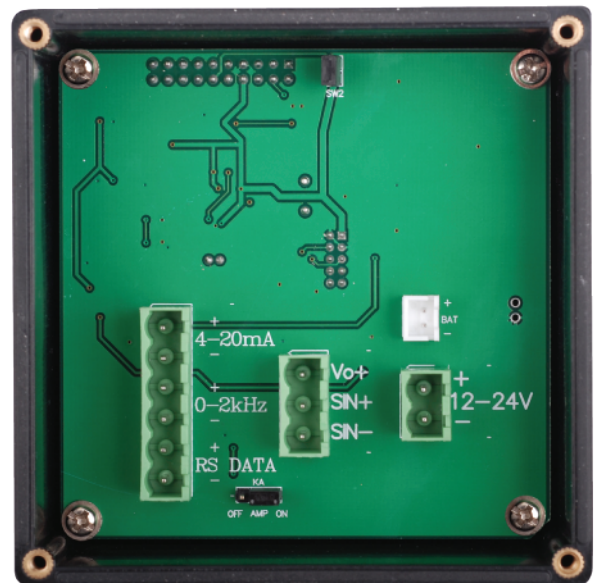
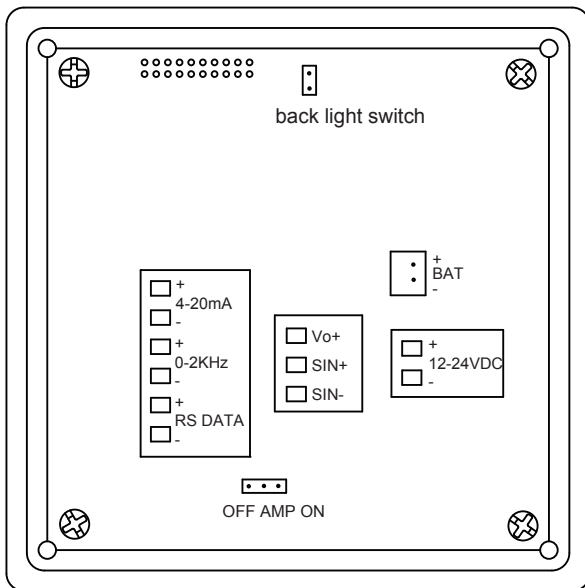


45° acceptable

Mounting location

The digital paddlewheel meters is designed to withstand outdoor conditions. a cool, dry location, where the unit can be easily serviced is recommended. the meter can be mounted on horizontal or vertical runs of pipe. mounting at the vertical (twelve o'clock) position on horizontal pipe is recommended. mounting anywhere around the diameter of vertical pipe is acceptable, however, the pipe must be completely full of water at all times. back pressure is essential on downward flows. see the minimum straight length of pipe requirement chart above. the meter can accurately measure flow from either direction.

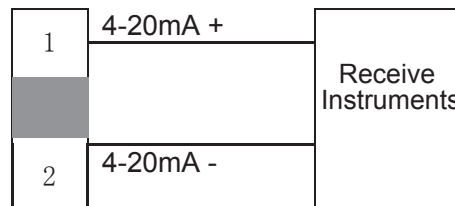
6. Terminal Description



1.)Terminal Description

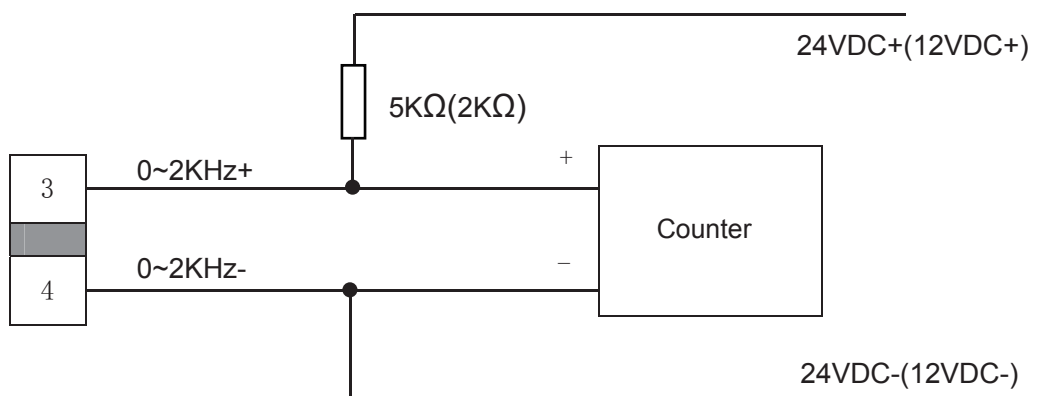
Items	Label	Function Instructions	Remarks
1	4-20mA +	4-20mA Output positive terminal	1, Load resistance:750Q (with link) 2, Hart Communications external 24VDC power supply Active Output Mode
2	4-20mA -	4-20mA Output negative terminal	
3	0~2KHz+	Frequency/pulse output positive terminal	The output amplitude of 24V load current <=50mA
4	0~2KHz-	Frequency/pulse output negative terminal	
5	RS485date+	RS485 Communication positiveterminal	RS485 communication function (n just for transmitter has this function)
6	RS485date -	RS485 Communication negativeterminal	
7	Vo+	Hall parts supply	When the signal sensing element is a coil,connect signal + and signal -(hop cap connect AMP and ON) when signal sensing element is Hall Parts,hop cap connect AMP and OFF
8	SIN+	signal +	
9	SIN-	signal -	
10	(12-24V) +	24VDC Power, positive terminal	Power range: 12 VDC -24VDC
11	(12-24V) -	24VDC Power, negative terminal	
12	BAT+	battery supply+	When power is battery,we suggest pull out the hop cap of SW2 for extend battery service life.
13	BAT-	battery supply-	

2.) Electric current output



The converter current output electrical isolation has been achieved. Output to take an active approach. Current output mode 4-20mA, 20mA current output value from the corresponding traffic parameter item "scale flow of value" is determined (reference to factory nameplate on the instrument measuring range a value). The maximum current output load resistance of 750Q, the load resistance includes the cables used to connect the resistance. Current output cable is recommended RWP2x16/015 PVC insulated sheathed cable shield. 2.

3.) Pulse, frequency output



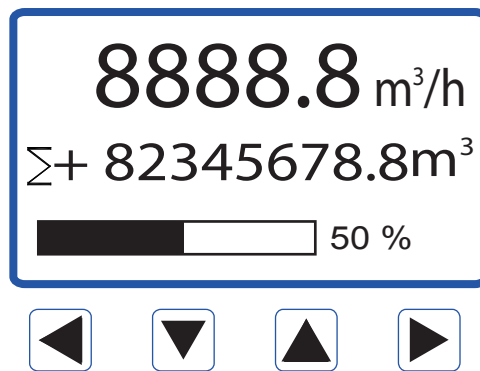
The Transmitter frequency, pulse output has been achieved electrical isolation, the output for the active mode (see above chart). Transmitter frequency, pulse output with transistor output mode. Maximum pulse output frequency 5KHZ, the output pulse amplitude of 24V. Active mode the maximum load current 50mA, passive mode the maximum load current 0.2A. As the frequency and pulse output terminals are shared, it is not to choice two output modes. Users can set the parameter "frequency output" to select the work. Frequency output upper limit corresponding to the measured flow value by the parameter item "scale flow value" decision (reference instruments to measure the scope of a factory nameplate values). Pulse output equivalent by the parameter 'pulse equivalent L / P "decision.

4.) Function of communication

Transmitter communication with RS485, MODBUSASC, MODBUSRTU communications capabilities (requires a user specified when ordering). Available through the "485 output communication protocol" parameter is set to specify. Instrument Communication Interface specific technical note on "protocol."

7.Operations

1.) Panel construction and key definition



2.) Function instructions

set parameters confirmation and set key of exit sub-menu (◀ key)

enter sub-menu and cancel set key(▶ key)

set item "DOWN" and data variables "degression" key(▼ key)







set item"MOVE" and data variables"increase"key (▲ key)

Instructions:

Instrument Display Interface

1. The first line shows an instantaneous flow rate, flow rate display units can be in the 'flow unit' function key to choose;
2. The second line shows the cumulative total amount and cumulative units;
- 3 . The third line shows the percentage of traffic

3.) menu construction

Mode of Measuree press 	Configuration Menu press 	Parameter item Press 	Secondary Parameter item
	1. BASIC	1.1 PV Units	
		1.2 PV Decimal	
		1.3 Total Units	
		1.4 Total Decimal	
		1.5 Damping(s) (0.1~99.9)	
	2. SYSTEM	2.1 New Password	
		2.2 Language	
		2.2 Signal	2.2.1 Qmax(m3/h) 2.2.2 Low Cutoff%
		2.3 Pulse Output	2.3.1 Freq Direct 2.3.2 Freq Max(Hz) 2.3.3 Liter/Pulse 2.3.4 Pulse Width(ms) 2.3.5 Pulse Level
		2.4 RS485 Output	2.4.1 RS485 Ptotocol 2.4.2 Baudrate 2.4.3 Data Bit 2.4.4 Parity 2.4.5 Stop Bit 2.4.6 Dev Address
		2.5 Total Set	2.5.1 Clear Total 2.5.2 FWD preset(m3)
		2.6 Load Settings	
	3. CALIBRATION	3.1 4mA Trim	
		3.2 20mA Trim	
	4. TEST	4.1 Loop Test	
		4.2 Pulse Test	
Mode of Measuree Press	Configuration Menu press 	Parameter item Press 	Secondary Parameter item Press 

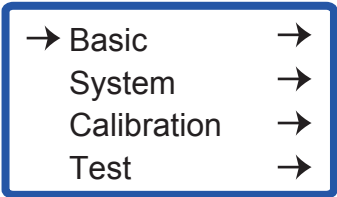
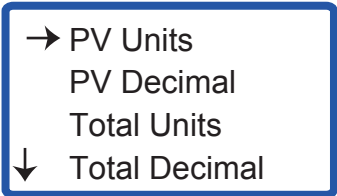
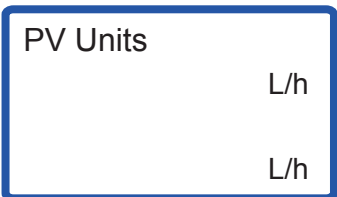
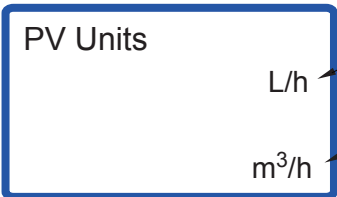
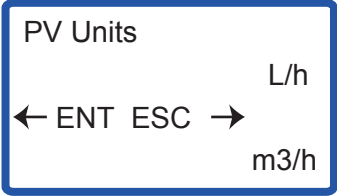
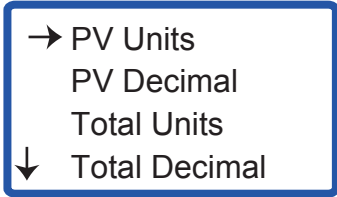
4.) detail parameter instructions

parameter item	parameter setting range	instructions
flow unit	L/S, L/m, L/h, m3/S, m3/m, m3/h, G/S, G/m, G/h	S=second,M=minute, H=hour,L=liter, M3=cubic meter,G=gallon
totalizer unit	L, m3,G	
flow display resolution	1, 2, 3	set the instantaneous flow of decimal places displayed
totalizer display resolution	1, 2, 3	set the totalizer flow of decimal places displayed
language	chinese, english	
scale flow	0.0001-999999999	unit: m3/h
termination of small flow	0.0-9.9	this parameter can move small flow display,the percentage for the full range
upper frequency limit	100.0-5000.0Hz	maximum frequency output,it's effectual when pulse equivalent is ZERO
pulse equivalent	larger than system's minimum is ok	one pulse on behalf of how many liters
pulse width	0.0-1000.0ms	do not need under normal condition
pulse level	low effective ,high effective	clear total accumulation
clear accumulation	No, Yes	
preset positive accumulation		If replace instrument,can input previous totalizer flow,continue to accumulation
4mA calibration	3.000-5.000	calibrate output signal without flow.
20mA calibration	19.000-21.000	calibrate output signal of full range

5). detail instructions


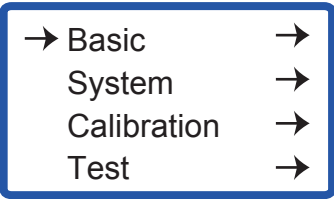


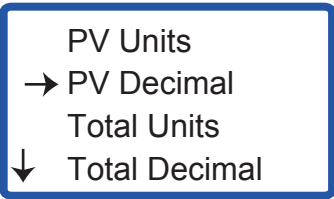

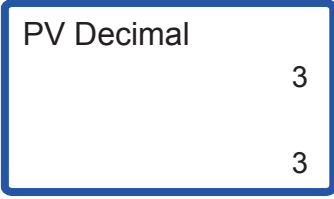


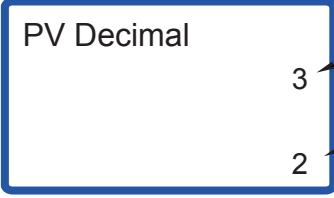

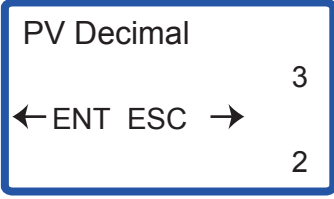


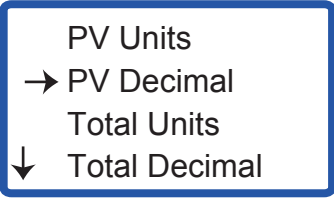

1.) Unit of flow

Adjust instant flow's unit, the setting rang L/S, L/min, L/h, m3/S, m3/min, m3/h, G/S, G/min, G/h.

Steps	Operation instructions	Interface show
1	In the measurement mode, press "▶" into configuration menu	
2	Press "▶" into Basic menu	
3	Press "▶" into PV Units	
4	Presses "▼" or "▲" set the Unit of flow	
5	Press "◀" quit setup menu, LCD show confirm menu	
6	Press "◀" to confirm the change, Press "▶" to give up modify	
7	Press "◀" two times back to measurement, also you can continue other operation	


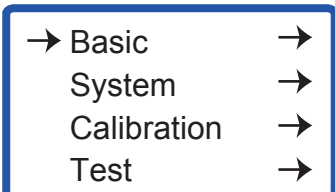


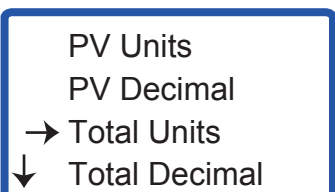

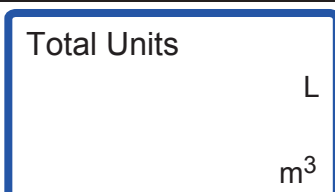


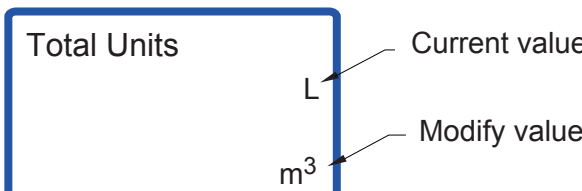

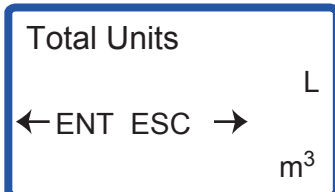


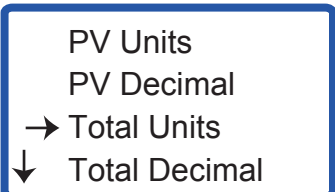

2.)Instantaneous flow Resolution

Adjust the instantaneous flow of small points indicate the medium, set the range of 1-3

Steps	Operation instructions	Interface show
1	In the measurement mode, press “  ” into configuration menu	
2	Press “  ” into Basic menu Click “  ” to choice PV decimal	
3	Click “  ” into “PV decimal menu	
4	Prees “  ” or “  ” set the nstantaneous flow Resolution	
5	Press “  ” quit setup menu ,LCD show confirm menu	
6	Press “  ” to confirm the change , Press “  ” to give up modify	
7	Press “  ” two times back to mesurement, also you can continue other operation	


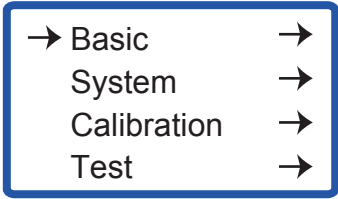


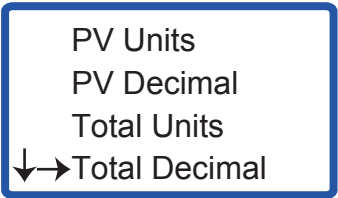

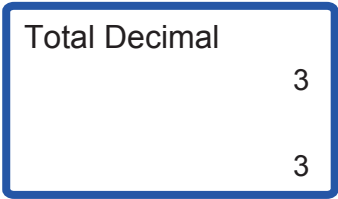


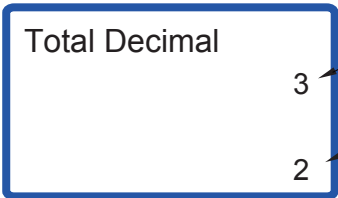

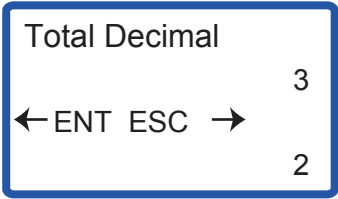


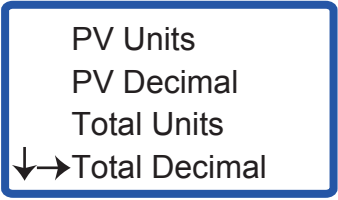

3.) Unit of total

Adjust Total unit, setting range L,m3,gal

Steps	Operation instructions	Interface show
1	In the measurement mode, press “  ” into configuration menu	
2	Press “  ” into Basic menu Click “  ” to choice Total Unitsl	
3	Click “  ” into “Total Units menu	
4	Prees “  ” or “  ” set the Unit of total	
5	Press “  ” quit setup menu ,LCD show confirm menu	
6	Press “  ” to confirm the change , Press “  ” to give up modify	
7	Press “  ” two times back to mesurement, also you can continue other operation	

4.)Cumulative total flow resolution

Adjusted cumulative flow dots show the median, set the range of 1-3 decimal places

Steps	Operation instructions	Interface show
1	In the measurement mode, press “  ” into configuration menu	
2	Press “  ” into Basic menu Click “  ” to choice Total Decimal	
3	Click “  ” into “Total Decimal” menu	
4	Prees “  ” or “  ” set the Cumulative total flow resolution	
5	Press “  ” quit setup menu , LCD show confirm menu	
6	Press “  ” to confirm the change , Press “  ” to give up modify	
7	Press “  ” two times back to mesurement, also you can continue other operation	



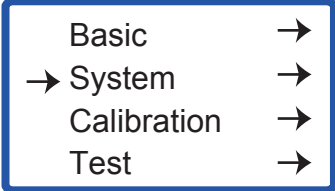


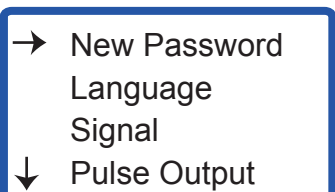

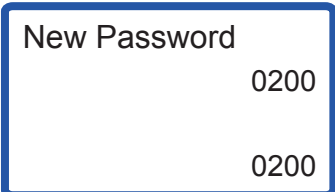



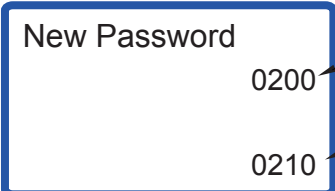

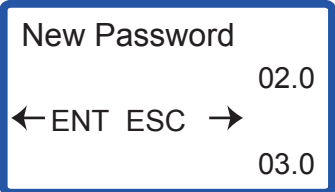


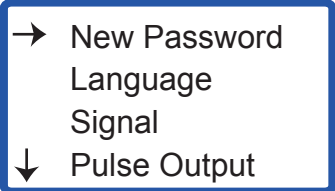

5.) Damping time (S)

Damping time on the meter display and output. Set range o 1-99 9S (unit is "seconds").
Set as follows:

Steps	Operation instructions	Interface show
1	In the measurement mode, press "▶" into configuration menu	<div> → Basic → System → Calibration → Test → </div>
2	Press "▶" into Basic menu Click "▼" to choice Damping(S)	<div> ↑ PV Decimal Total Units Total Decimal → Damping(S) </div>
3	Click "▶" into "Damping(S) menu	<div> Damping(S) 02.0 Max: 99.9 Min: 0.2 02.0 </div>
4	Prees "▼" or "▲" and "▶" set the Damping time	<div> Damping(S) 02.0 Max: 99.9 Min: 0.2 03.0 </div> <div> current value Modify value </div>
5	Press "◀" quit setup menu , LCD show confirm menu	<div> Damping(S) 02.0 ← ENT ESC → 03.0 </div>
6	Press "◀" to confirm the change , Press "▶" to give up modify	<div> ↑ PV Decimal Total Units Total Decimal → Damping(S) </div>
7	Press "◀" two times back to mesurement , also you can continue other operation	















6.)New Password

system constituent's initial password:0200

Steps	Operation instructions	Interface show
1	In the measurement mode, press “  ” into configuration menu,Click “  ” to choice “System” item	
2	press the key of  ,show password interface,enter password,press the key of  enter into system constituent menu	
3	Click “  ” into “New Password” menu	
4	Prees“  ” or “  ”and “  ”set the New Password	
5	Press “  ”quit setup menu , LCD show confirm menu	
6	Press“  ”to confirm the change , Press“  ”to give up modify	
7	Press“  ”two times back to mesurement, also you can continue other operation	

7.)Scale flow (m3/h)
















Meter-scale flow (QMAX) range depending on the caliber meter . Scale flow units: m3/h.

Steps	Operation instructions	Interface show
1	In the measurement mode, press “  ” into configuration menu, Click “  ” to choice “System” item	<div> Basic → → System → Calibration → Test → </div>
2	press the key of  , show password interface, enter password, press the key of  enter into system constituent menu	<div> → New Password Language Signal ↓ Pulse Output </div>
3	Press “  ” to choice “Signal” item	<div> New Password Language → Signal ↓ Pulse Output </div>
4	Press “  ” into “Signal” menu	<div> → Qmax(m3/h) Low Cutoff% </div>
5	Press “  ” into “Qmax(m3/h)” menu, Press “  ” or “  ” and “  ” set the Scale flow	<div> Qmax(m3/h) Max: 99999999 Min: 0.000100 100.0 120.0 </div> <div> current value Modify value </div>
6	Press “  ” quit setup menu , LCD show confirm menu	<div> Qmax(m3/h) 100.0 ← ENT ESC → 120.0 </div>
7	Press “  ” to confirm the change , Press “  ” to give up modify	<div> Qmax(m3/h) Low Cutoff% </div>
8	Press “  ” three times back to measurement, also you can continue other operation	

8.) Small flow termination%(low %)

The parameters on the display and output are valid. When the traffic signal to terminate below the low flow rate (unit%) of the settings to set the value of the The signal will be removed, display and output to zero.

The termination of the small percentage is relative to the scale in terms of flow rate settings. Set As follows

Steps	Operation instructions	Interface show
1	In the measurement mode, press “  ” into configuration menu, Click “  ” to choice “System” item	<div> Basic → → System → Calibration → Test → </div>
2	press the key of  , show password interface, enter password, press the key of  , enter into system constituent menu	<div> → New Password Language Signal ↓ Pulse Output </div>
3	Press “  ” to choice “Signal” item	<div> New Password Language → Signal ↓ Pulse Output </div>
4	Press “  ” into “Signal” menu Press “  ” to choice “Low Cutoff” item	<div> Qmax(m3/h) → Low Cutoff% </div>
5	Press “  ” into “Low Cutoff%” menu, Press “  ” or “  ” and “  ” set the Small flow	<div> Low Cutoff% Max: 9.9 Min: 0.0 1.0 1.0 </div> <div> current value Modify value </div>
6	Press “  ” quit setup menu , LCD show confirm menu	<div> Low Cutoff% 1.0 ← ENT ESC → 2.0 </div>
7	Press “  ” to confirm the change , Press “  ” to give up modify	<div> Qmax(m3/h) Low Cutoff% </div>
8	Press “  ” three times back to measurement , also you can continue other operation	

9.) Frequency upper limit Hz (output frequency range of the instrument 100-5000Hz)



When the Liter/ pulse = 0.0, the case "frequency cap Hz" setting determines the frequency of the output
















When the Liter/pulse >0.0, the setting of L/P determines the frequency output

Steps	Operation instructions	Interface show
1	In the measurement mode, press "▶" into configuration menu, Click "▼" to choice "System" item	<div> Basic → → System → Calibration → Test → </div>
2	press the key of ▶, show password interface, enter password, press the key of ▶ enter into system constituent menu	<div> → New Password Language Signal ↓ Pulse Output </div>
3	Press "▼" to choice "Pulse Output" item	<div> New Password Language Signal ↓→ Pulse Output </div>
4	Press "▶" into "Pulse Output" menu, Press "▼" to choice "Freq Max(Hz)" item	<div> Freq Direct → Freq Max(Hz) Liter/Pulse ↓ PulseWidth(ms) </div>
5	Press "▶" into "Freq Max(Hz)" menu, Press "▼" or "▲" and "▶" set the Frequency upper limit	<div> Freq Max(Hz) 4000.0 Max: 5000.0 Min: 100.0 5000.0 </div> <div> current value Modify value </div>
6	Press "◀" quit setup menu, LCD show confirm menu	<div> Freq Max(Hz) 4000.0 ← ENT ESC → 5000.0 </div>
7	Press "◀" to confirm the change, Press "▶" to give up modify	<div> Freq Direct → Freq Max(Hz) Liter/Pulse ↓ PulseWidth(ms) </div>
8	Press "◀" three times back to measurement, also you can continue other operation	



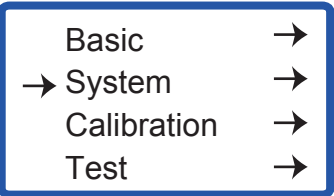


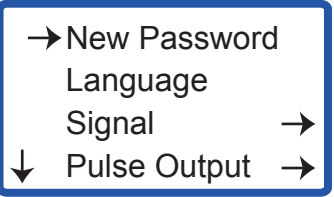

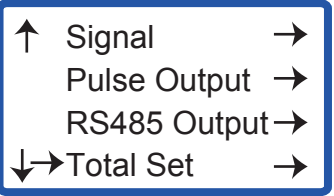

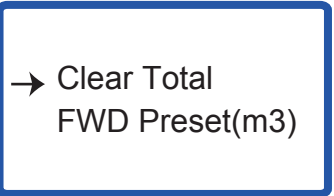





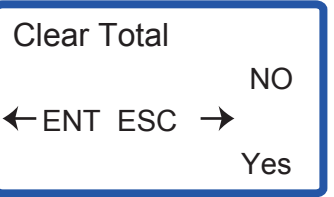




10.) Liter/pulse(L/P)

Scale corresponding to the current flow of output frequency













$$\text{Output Frq(Hz)} = \frac{\text{Current Flow(m3/h)} / 3.6}{\text{Liter/pulse(L/P)}} \quad \frac{\text{Current Flow(L/s)}}{\text{Liter/pulse(L/P)}}$$

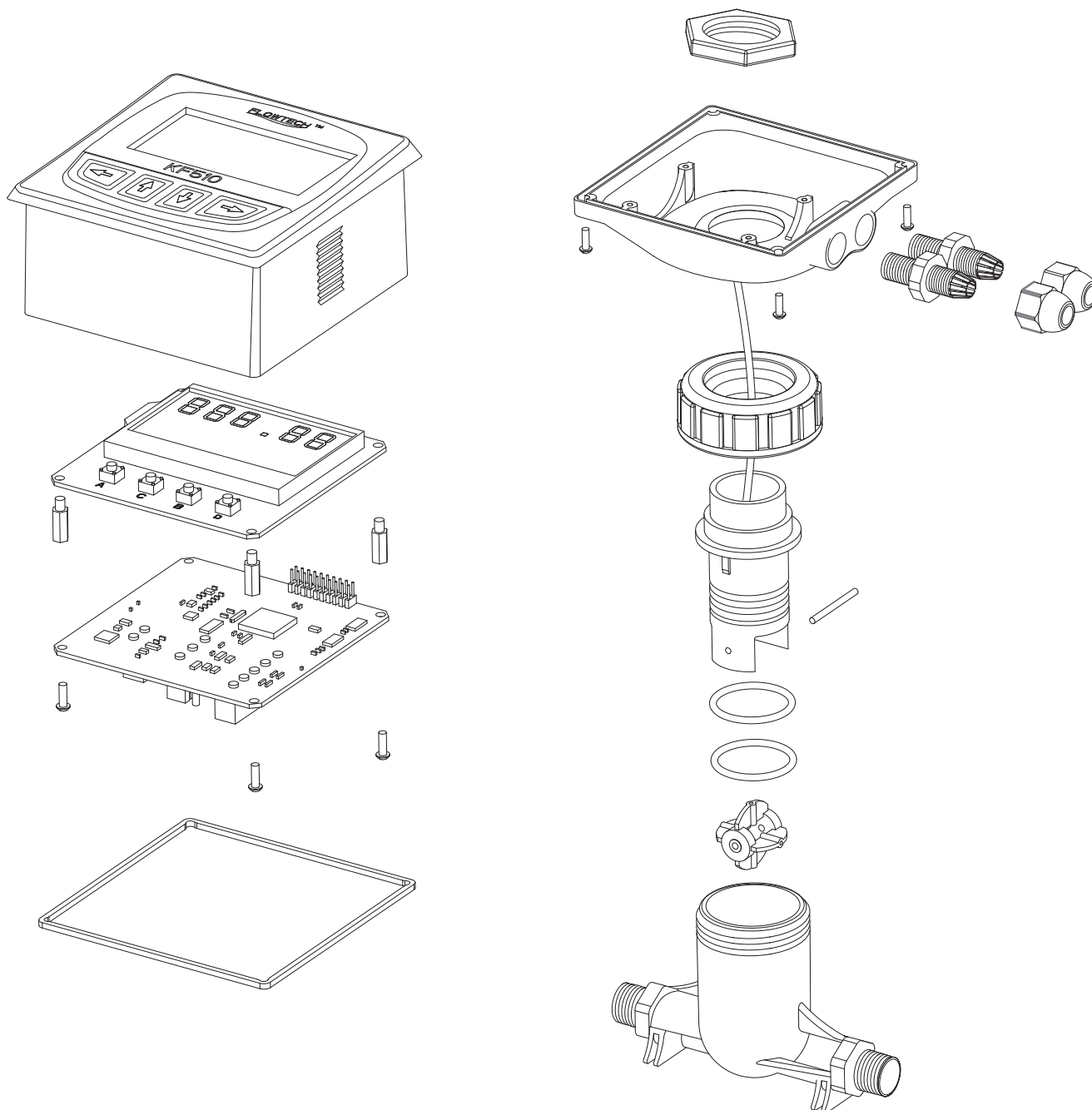
Steps	Operation instructions	Interface show
1	In the measurement mode, press “  ” into configuration menu, Click “  ” to choice “System” item	<div> Basic → → System → Calibration → Test → </div>
2	press the key of  , show password interface, enter password, press the key of  enter into system constituent menu	<div> → New Password Language Signal ↓ Pulse Output </div>
3	Press “  ” to choice “Pulse Output” item	<div> New Password Language Signal ↓→ Pulse Output </div>
4	Press “  ” into “Pulse Output” menu, Press “  ” to choice “Liter/Pulse” item	<div> Freq Direct Freq Max(Hz) → Liter/Pulse ↓ PulseWidth(ms) </div>
5	Press “  ” into “Liter/Pulse” menu, Press “  ” or “  ” and “  ” set the Liter/Pulse	<div> Liter/Pulse 0.00000 Max: ----- Min: 0.00055 0.01000 </div> <div> current value Modify value </div>
6	Press “  ” quit setup menu , LCD show confirm menu	<div> Liter/Pulse 4000.0 ← ENT ESC → 5000.0 </div>
7	Press “  ” to confirm the change , Press “  ” to give up modify	<div> Freq Direct Freq Max(Hz) → Liter/Pulse ↓ PulseWidth(ms) </div>
8	Press “  ” three times back to measurement , also you can continue other operation	

11 .) Cumulate Clear

Steps	Operation instructions	Interface show
1	In the measurement mode, press “  ” into configuration menu, Click “  ” to choice “System” item	
2	press the key of  , show password interface, enter password, press the key of  enter into system constituent menu	
3	Press “  ” to choice “Total Set” item	
4	Press “  ” into “Clear Total” menu	
5	Press “  ” into “Clear Total” menu, Press “  ” or “  ” set the YES or NO	
6	Press “  ” quit setup menu , LCD show confirm menu	
7	Press “  ” two times to Clear Total, Press “  ” to give up modify	
8	Press “  ” three times back to measurement, also you can continue other operation	

12.)Preset total positive

Steps	Operation instructions	Interface show
1	In the measurement mode, press “  ” into configuration menu, Click “  ” to choice “System” item	<div> Basic → → System → Calibration → Test → </div>
2	press the key of  , show password interface, enter password, press the key of  , enter into system constituent menu	<div> → New Password Language Signal → ↓ Pulse Output → </div>
3	Press “  ” to choice “Total Set” item	<div> ↑ Signal → Pulse Output → RS485 Output → ↓→ Total Set → </div>
4	Press “  ” into “Pulse Output” menu	<div> → Clear Total FWD Preset(m3) </div>
5	Press “  ” to choice “FWD Preset(m3)” item	<div> Clear Total → FWD Preset(m3) </div>
6	Press “  ” into “Clear Total” menu, Press “  ” or “  ” set the YES or NO	<div> FWD Preset(m3) 000.000000 Max: ----- Min: ----- 500.000000 </div>
8	Press “  ” quit setup menu	<div> → Clear Total FWD Preset(m3) </div>
7	Press “  ” three times back to measurement, also you can continue other operation	



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